FAST APPROXIMATION METHODS FOR FINDING MINIMUM COST FLOWS WITH SHARED RECOVERY STRATEGIES, AND SYSTEM USING SAME

5   **Abstract**

Broadly, techniques for solving network routing within a predetermined error are disclosed. These techniques may be applied to networks supporting dedicated reserve capacity, where reserved capacity on links in the network is dedicated for a particular commodity (generally, a source and sink pair of computers), and shared recovery, where reserved capacity on links is shared amongst two or more commodities. These techniques use an iterative process to determine flows on each of the links in a network. Costs are set for each commodity, and primary and secondary (i.e., backup) flows are initialized. A commodity is selected and demand for the commodity is routed through the shortest path. Costs are updated for each potential failure mode. For each commodity, the flows and costs are updated. Once all flows and costs are updated, then it is determined if a function is less than a predetermined value. If the function is less than a predetermined value, then the commodity selection, and flow and cost adjustments are again performed. If the function is greater than the predetermined amount, then the network routing problem is solved to within a predetermined amount from an optimal network routing.